



Rocky Flats Environmental Technology Site

PRE-DEMOLITION SURVEY REPORT (PDSR)

BUILDING 709
(Building 707's Old Cooling Tower)

707 CLOSURE PROJECT

REVISION 0

September 27, 2001



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"REVIEWED FOR CLASSIFICATION
By R.H. ESSIG
Date 9/27/01

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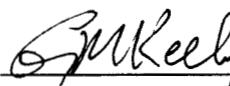
PRE-DEMOLITION SURVEY REPORT (PDSR)

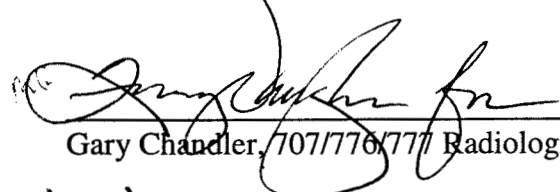
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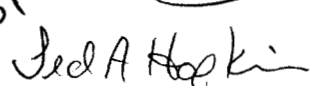
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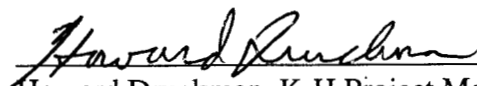
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September 27, 2001

Written by:  Date: 9/28/01
Gerry Kelly, D&D Programs

Reviewed by:  Date: 9/28/01
Gary Chandler, 707/776/777 Radiological Manager

Reviewed by:  Date: 9/27/01
Ted Hopkins, 707/776/777 Environmental Compliance Manager

Approved by:  Date: 9/27/01
Howard Druckman, K-H Project Manager

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- B Radiological and Chemical Characterization Package
- C Radiological Data Summaries and Survey Maps
- D Chemical Data Summary and Sample Map
- E Data Quality Assessment (DQA) Details

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ABBREVIATIONS/ACRONYMS

ACM	Asbestos containing material
Am	Americium
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Chain of custody
DCGL _{EMC}	Derived Concentration Guideline Level – elevated measurement comparison
DCGL _W	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
K-H	Kaiser-Hill
LBP	Lead-based paint
LCS	Laboratory control sample
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDL	Minimum detectable limit
MS	Matrix spike
MSD	Matrix spike duplicate
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PDS	Pre-Demolition Survey
PDSP	Pre-Demolition survey Plan
Pu	Plutonium
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSA	Removable Surface Activity
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TSA	Total surface activity
U	Uranium
V&V	Verification and validation
VOCs	Volatile organic compounds

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EXECUTIVE SUMMARY

A Pre-Demolition Survey (PDS) was performed to enable compliant disposition and waste management of Building 709, the old Building 707 Cooling Tower (referred to as B709). The PDS encompassed radiological characterization pursuant to the D&D Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The characterization built upon physical, chemical and radiological hazards identified in the *Reconnaissance Level Characterization Report for Group A Facilities*, October 14, 1999. Sampling of environmental media surrounding the facility was also conducted according to the Soil Disturbance Permit process.

Results indicate that no radiological contamination exists in excess of the prescribed release limits of DOE Order 5400.5. Asbestos containing insulation exists on piping associated with the cooling tower pumps, and will be removed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations. Facility surfaces may contain paints with PCBs and metals. All demolition debris will be managed in compliance with regulations governing PCBs (40 CFR 761), and Environmental Compliance Guidance #27, *Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal* as applicable. In addition, concentrations of potential soil contaminants were all significantly below the Rocky Flats Cleanup Agreement Tier II soil action levels.

To ensure that the facility remains free of contamination and that PDS data remain valid, isolation controls will be established and posted accordingly. Demolition shall not occur until the PDS Report is submitted and approved.

Additional post-demolition radiological surveys must be performed on the upper reaches of Building 709 prior to its free release; safety considerations precluded access during this PDS. Process knowledge strongly indicates that these surveys will allow free release of materials for off-site disposal.

Building 709 may be classified as a Type I building (uncontaminated) under the Rocky Flats Cleanup Agreement (RFCA). A minor modification to 707's Decision Document "Decommissioning Operations Plan" (DOP) may be needed to remedy Building 709's current erroneous classification as Type II (mildly contaminated); the Type II classification was conservatively made based on a preliminary reconnaissance data evaluation.

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INTRODUCTION

A Pre-Demolition Survey (PDS) was performed to enable compliant disposition and waste management of the Building 709, the old Building 707 Cooling Tower (referred to as B709). This facility no longer supports the RFETS mission and needs to be removed to reduce Site infrastructure, risks and/or operating costs. The location of the cooling tower is shown in Attachment A.

This document presents the PDS results as well as results from soil sampling conducted according to the Soil Disturbance Permit process. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS built upon physical, chemical and radiological hazards identified in the *Reconnaissance Level Characterization Report for Group A Facilities*, October 14, 1999.

1.1 Purpose

The purpose of this report is to communicate and document the results of the PDS and soil sampling efforts. PDSs are performed before building demolition to define the final radiological and chemical conditions of a facility. Final conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

1.2 Scope

This report presents the final radiological and chemical conditions of B709. Environmental media surrounding the facility were also sampled and analyzed using the Soil Disturbance Permit process. Both facility and environmental media will be dispositioned pursuant to the Rocky Flats Cleanup Agreement (RFCA).

1.3 Data Quality Objectives

The Data Quality Objectives (DQOs) used in designing this PDS are consistent with those defined in the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to Section 2.0 of MAN-127-PDSP for these DQOs.

2 RECONNAISSANCE LEVEL CHARACTERIZATION

A facility-specific Reconnaissance Level Characterization (RLC) was conducted to understand the facility history and related hazards. The RLC consisted of a facility walkdown, interviews, document review, including review of the Historical Release Report, radiological surveys, and chemical sampling and analysis. The RLC was performed as part of the RLC for the Group A Facilities in FY 1999; radiological and chemical constituents were identified above laboratory detection limits. Results are documented in the *Reconnaissance Level Characterization Report for Group A Facilities*, October 14, 1999.

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3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

Building 709 was characterized to confirm that the structure meets unrestricted release criteria per the PDSP. Section 3.1 describes the radiological characterization process that was performed, and Section 3.2 summarizes the radiological hazards that were identified, if any.

3.1 Radiological Characterization

Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on or in B709. Measurements were performed to evaluate the contaminants of concern. Based upon a review of the RLCR, historical and process knowledge, building walkdowns, and MARSSIM guidance, a characterization package was developed during the planning phase that describes how the facility was broken-down into survey units and the minimum survey requirements (refer to Attachment B).

Radiological survey unit packages were developed for each survey unit in accordance with Radiological Safety Practices (RSP) 16.01, "Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure." Total Surface Activity (TSA), removable, and scan measurements were collected in accordance with RSP 16.02 "Radiological Surveys of Surfaces and Structures." Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, "Radiological Survey/Sample Data Analysis." Quality Control measures were implemented thorough the survey and sampling process in accordance with RSP 16.05, "Radiological Survey/Sample Quality Control."

During performance of scan surveys for survey unit 707001, elevated readings were detected on the concrete surfaces of the cooling tower basin. A media sample of the concrete basin was obtained and analyzed off-site for transuranics. The data established that DOE added radionuclides above release thresholds are not present.

In addition, during performance of scan surveys for survey unit 707002, elevated readings were detected on the metal deck plating of the emergency diesel generator platform. It was suspected that Po-210 was the contaminant. A coupon was obtained, and it was verified that no DOE added material was present, and the elevated readings were a result of the presence of Po-210.

More detailed discussions of the concrete media and metal deck plating coupon samples are presented in Attachment C to this report.

Five subsurface soil samples were collected and analyzed in accordance with the Soil Disturbance Permit process. Samples were collected at a depth of three feet and analyzed for radionuclides of concern.

Radiological survey and sampling data, statistical analysis results, and survey locations are presented in Attachment C, Radiological Data Summaries and Survey Maps. Radiological data from the soil sampling are also included. Radiological survey unit packages are maintained in the B709 Characterization Project files, as well as the soil sampling data.

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3.2 Radiological Hazards Summary

The PDS confirmed that B709 does not contain radiological contamination above the surface contamination guidelines provided in DOE Order 5400.5 and the RFETS Radiological Control Manual. Isolation control postings will be displayed on the structure to ensure no radioactive materials are introduced.

Concentrations of plutonium, americium and uranium in soils were all below the RFCA Tier II soil action levels. Refer to Attachment C.

4 CHEMICAL CHARACTERIZATION AND HAZARDS

B709 and the surrounding soils were characterized for chemical hazards per the PDSP and the Soil Disturbance Permit process. Section 4.1 describes the chemical characterization process that was performed, and Section 4.2 summarizes the chemical hazards that were identified, if any.

4.1 Chemical Characterization

Chemical characterization was performed to determine the nature and extent of chemical contamination that may be present on or in B709. Based upon a review of RLCR, historical and process knowledge, visual inspections, and PDSP DQOs, additional characterization needs were determined. A characterization package was developed during the planning phase that describes additional characterization requirements, including soil sampling requirements (refer to Attachment B). Refer to Attachment D, Chemical Summary Data and Sample Map, for details on sample results and sample locations.

4.1.1 Asbestos

An asbestos inspection of B709 was previously performed by a CDPHE-certified asbestos inspector. The results of the characterization are provided in the RLCR for Group A Facilities. However, the adjacent chemical feed and fire protection sheds had not been inspected. Therefore, a CDPHE-certified asbestos inspector conducted an inspection of the sheds. No suspect materials were identified, and therefore, no additional sampling was required.

4.1.2 Beryllium (Be)

Based on process knowledge and personnel interviews, there is no reasonable likelihood for Be to be present. Therefore, no Be sampling and analysis was conducted.

4.1.3 RCRA/CERCLA Constituents [including metals and volatile and semi-volatile organic compounds (VOCs & SVOCs)]

Based on process knowledge and personnel interviews, there is no reasonable likelihood for RCRA/CERCLA constituents to have contaminated B709. Also, the RLC demonstrated that concentrations of metals in the cooling tower wood were below the RCRA toxicity characteristic levels. In addition, Environmental Waste Compliance Guidance #27, *Lead-based Paint (LBP) and Lead-based paint Debris Disposal*, states that LBP debris generated outside of currently identified high contamination areas shall be managed as non-hazardous (solid) wastes, and additional analysis for characteristics of

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hazardous waste derived from LBP is not a requirement for disposal. Therefore, no sampling for RCRA/CERCLA constituents was needed or conducted.

Five subsurface soil samples were collected and analyzed in accordance with the Soil Disturbance Permit process. Samples were collected at a depth of three feet and analyzed for total metals, total volatile organic compounds, and total petroleum hydrocarbons.

4.1.4 Polychlorinated Biphenyls (PCBs)

Based on process knowledge and personnel interviews, there is no reasonable likelihood for PCBs to be present. Therefore, no PCB sampling and analysis was conducted. However, five subsurface soil samples were collected (at a depth of three feet) and analyzed for PCB in accordance with the Soil Disturbance Permit process.

Historical data and process knowledge give no reason to suspect that any specialized paints or coatings containing PCBs were applied to any of the painted surfaces on B709. The RFETS DPP establishes, in Section 2.2, that the presence of PCB bulk product materials, as long as the hazardous substance is an integral part of the building material, does not affect a Type I building classification. Current plans are to dispose of the B709 demolition debris in an off-site, non-hazardous solid waste landfill carrying a RCRA Subtitle D permit.

4.2 Chemical Hazards Summary

4.2.1 Asbestos

Asbestos containing insulation exists on piping associated with the cooling tower pumps. This insulation will be removed and disposed of in compliance with Environmental Protection Agency (EPA) and Colorado Department of Public Health and Environment (CDPHE) regulations.

4.2.2 Beryllium

Based on process knowledge and personnel interviews (RLC), there is no reasonable likelihood for Be to be present. Refer to the *Reconnaissance Level Characterization Report for Group A Facilities*, October 14, 1999.

4.2.3 RCRA/CERCLA Constituents

Based on process knowledge and personnel interviews (RLC), there are no hazards associated with historical spills/releases of RCRA/CERCLA constituents. Also, concentrations of metals and VOCs in soils were all below the RFCA Tier II soil action levels. Refer to Attachment C.

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4.2.4 PCBs

Based on process knowledge and personnel interviews (RLC), there are no hazards associated with any historical PCB spills/releases. It is not suspected that any specialized paints or coatings containing PCBs were applied to B709 surfaces. Plans are to dispose of demolition debris in an off-site, non-hazardous solid waste landfill.

Concentrations of PCBs in soils were all below the RFCA Tier II soil action levels. Refer to Attachment D.

5 PHYSICAL HAZARDS

Physical hazards associated with B709 consist of those common to standard industrial environments and include hazards associated with energized systems, utilities, and trips and falls. In addition, the facility has deteriorated over time and is in poor condition. In fact, the structure is condemned. Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

6 DATA QUALITY ASSESSMENT

Data used in making management decisions for decommissioning of B709, and consequent waste management, are of adequate quality to support the decisions documented in this report. The data presented in this report (Attachments B – D) were verified and validated relative to DOE quality requirements, applicable EPA guidance, and original DQOs of the project.

Adequate data quality for decision-making is required by the Kaiser-Hill Team Quality Assurance Program (K-H, 1997, §7.1.4 and 7.2.2), the DOE (Order 414.1A, Quality Assurance, §4.b.(2)(b)), and the Regulators (EPA Region VIII and the CDPHE). The data and consequent environmental decisions must be technically and legally defensible. Verification and validation (V&V) of the data, in concert with the DQO process, ensure that data used in decisions resulting from the PDS are usable and defensible.

V&V of the data are the primary components of the DQA, and are detailed in the B709 Characterization Project files under the file header “DQA”. A summary of the decisions and uncertainties resulting from the DQO process specific to this project are displayed in Attachment E, Table E-6. DQA for radiological data drew heavily from guidance provided in the MARSSIM (NUREG-1575) and Radiological Safety Practices (RSPs) 16.04 and 16.05. V&V of non-radiological data drew from a number of requirements and guidance documents, including EPA QA/G-4 (EPA, 1994) and QA/G-9 (EPA, 1998). Other applicable guidance and requirements documents are referenced within the B709 Characterization Project files.

In summary, the V&V process corroborates that the following elements of the characterization process are adequate:

- ♦ the *number* of samples and surveys;

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- ♦ the *types* of samples and surveys;
- ♦ the sampling/survey process, in the field; and,
- ♦ the laboratory analytical process, relative to accuracy and precision considerations.

7 CONCLUSIONS

The PDS of B709 was performed in accordance with the DDCP and PDSP. All PDSP DQOs were met, and all data satisfied the PDSP DQA criteria. B709 does not contain radiological or hazardous wastes. All demolition debris will be managed in compliance with regulations governing PCBs (40 CFR 761), as applicable, in accordance with the Decommissioning Program Plan, Section 3.3.5. Asbestos containing material will be removed and disposed of in compliance with EPA and CDPHE regulations. To ensure that B709 remains free of contamination and that PDS data remain valid, isolation controls will be established, and the facility will be posted accordingly.

Additional post-demolition radiological surveys must be conducted on materials from the upper reaches of the cooling tower prior to its free release for off-site disposal as non-radiological waste. Absent detections of radioactivity above applicable thresholds, the survey reports from these post – demolition surveys will be filed in the CERCLA administrative record for the project. If radioactivity is detected above applicable thresholds, DOE and CDPHE will be promptly notified and the Consultative Process engaged.

Absent indications of radiological contamination during post demolition survey, this PDSR meets all DDCP expectations.

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8 REFERENCES

- DOE/RFEO, CDPHE, EPA, 1996. Rocky Flats Cleanup Agreement (RFCA), July 19, 1996.
- DOE Order 5400.5, "Radiation Protection of the Public and the Environment."
- DOE Order 414.1A, "Quality Assurance."
- EPA, 1994. "The Data Quality Objective Process," EPA QA/G-4.
- EPA, 1998. "Guidance for Data Quality Assessment," EPA QA/G-9.
- K-H, 1997. "Kaiser-Hill Team Quality Assurance Program", Rev. 5, December, 1997.
- K-H, 1999. Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP, Rev. 1, June 19, 2000.
- K-H, 1999. Reconnaissance Level Characterization Report for Group A Facilities, October 14, 1999.
- K-H, 2000. Pre-Demolition Survey Plan, MAN-127-PDSP, Rev. 0, March 26, 2001.
- MARSSIM - Multi-Agency Radiation Survey and Site Investigation Manual, December 1997 (NUREG-1575, EPA 402-R-97-016).
- PRO-475-RSP-16.01, Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure, September 30, 1999.
- PRO-476-RSP-16.02, Radiological Surveys of Surfaces and Structures, September 30, 1999.
- PRO-478-RSP-16.04, Radiological Survey/Sample Data Analysis, September 30, 1999.
- PRO-479-RSP-16.05, Radiological Survey/Sample Quality Control, September, 30, 1999
- PRO-563-ACPR, Asbestos Characterization Procedure, Revision 0
- RFETS, Environmental Waste Compliance Guidance #25, Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition, April 5, 1999
- RFETS, Environmental Waste Compliance Guidance #27, Lead-Based Paint (LBP) and Lead-Based Paint Debris Disposal, June 7, 1999

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ATTACHMENT A

Facility Location Map

And Photos

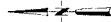
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EXPLANATION

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (20-Foot)
- Paved roads
- Dirt roads

DATA SOURCES: Aerial photography, ground and other surveys, and other data. The map is based on the 1994 aerial photography and the 1994 ground survey data. The map is not to scale and is not intended to be used for navigation or other purposes. The map is for informational purposes only. The map is not to be used for navigation or other purposes. The map is for informational purposes only.



Scale = 1:7500
1 inch represents approximately 632 feet



State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:
DynCorp
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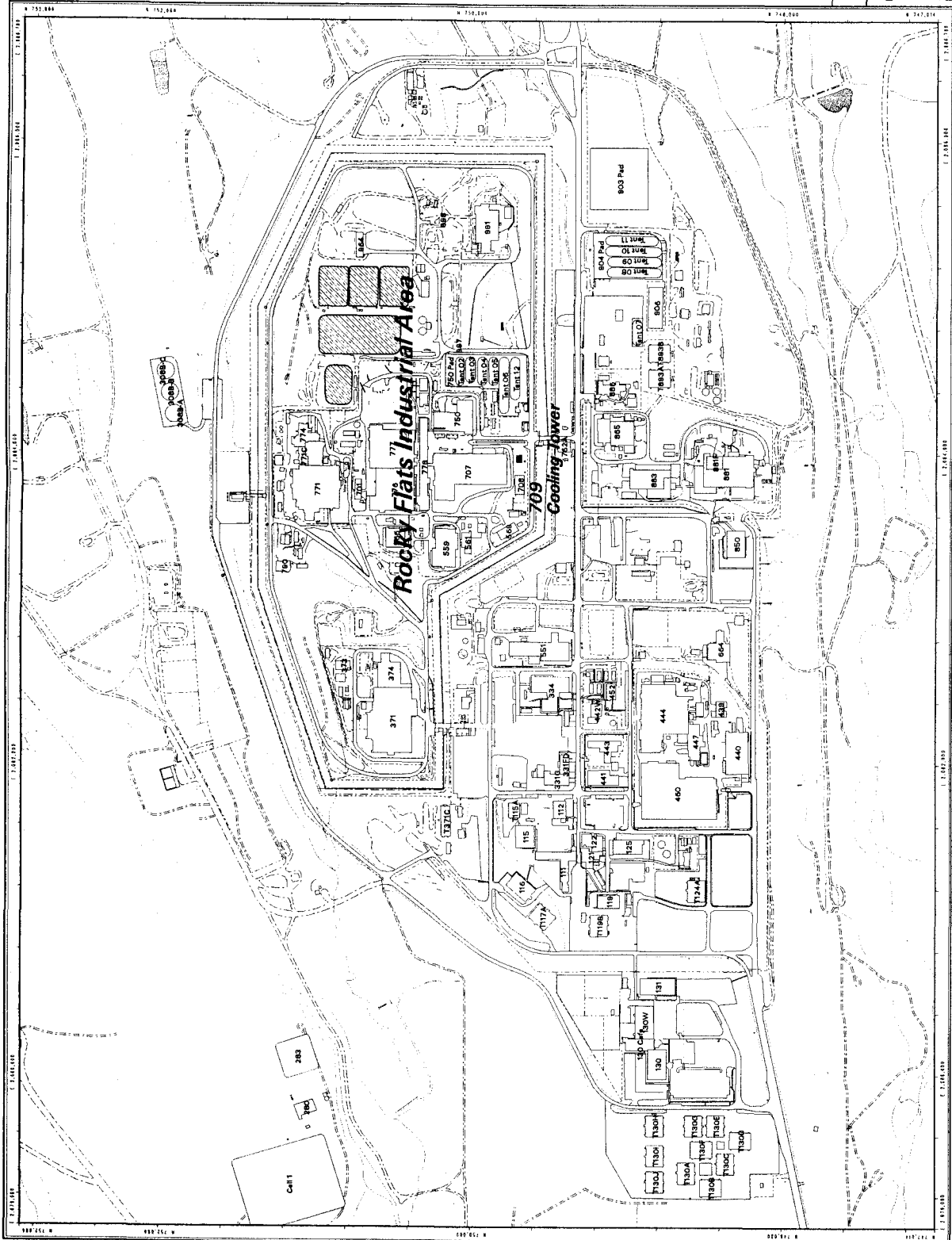
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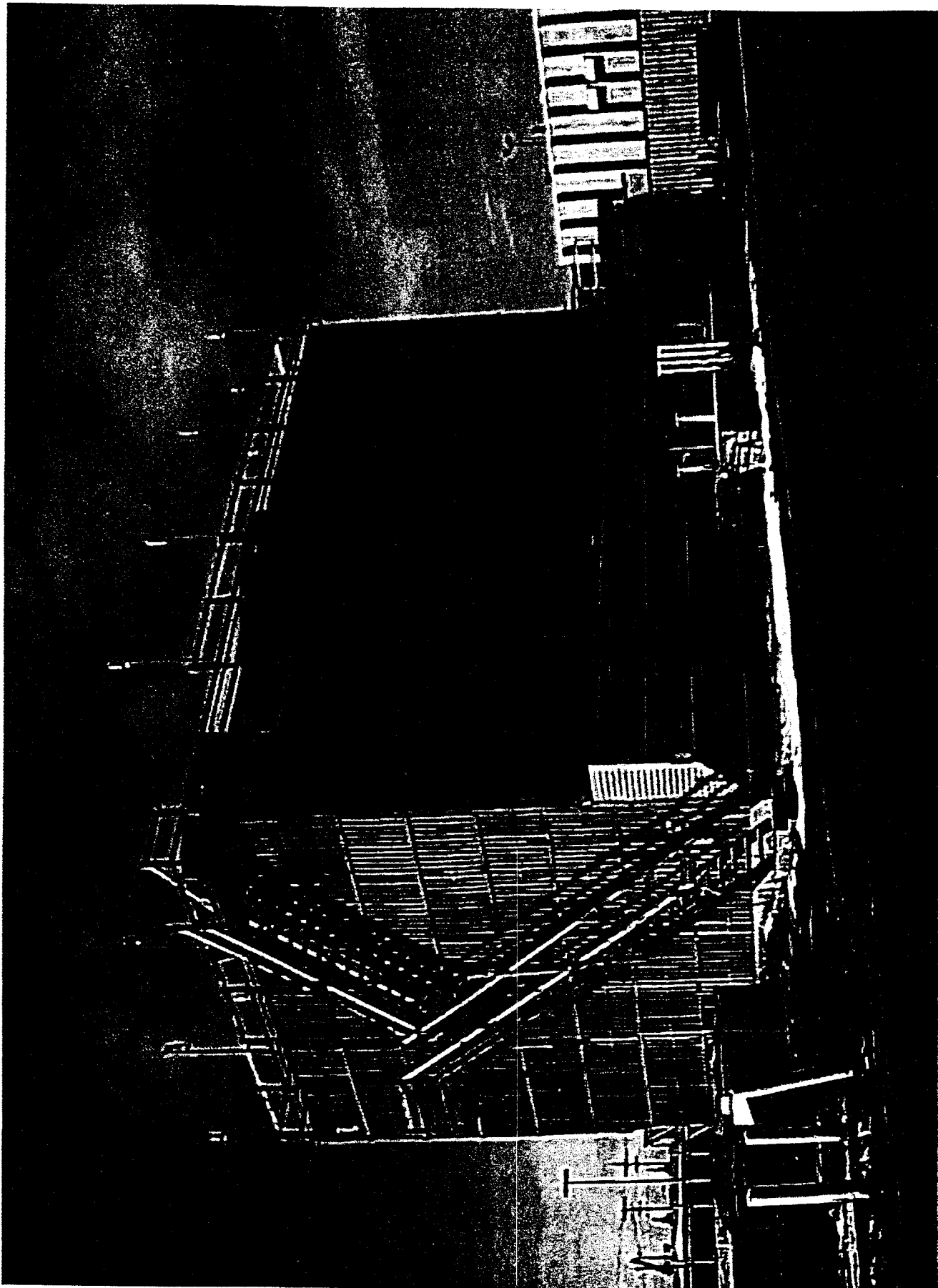


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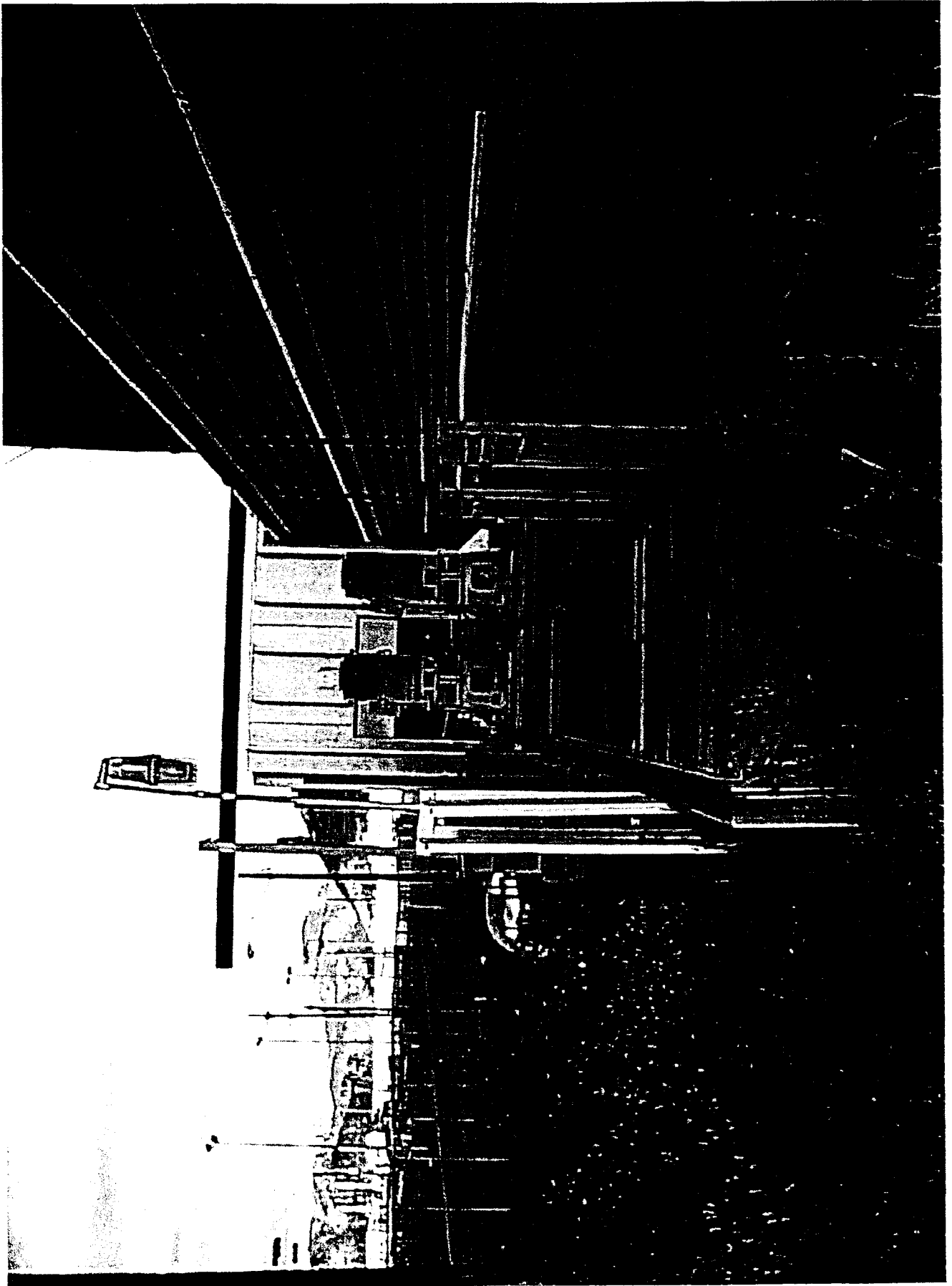
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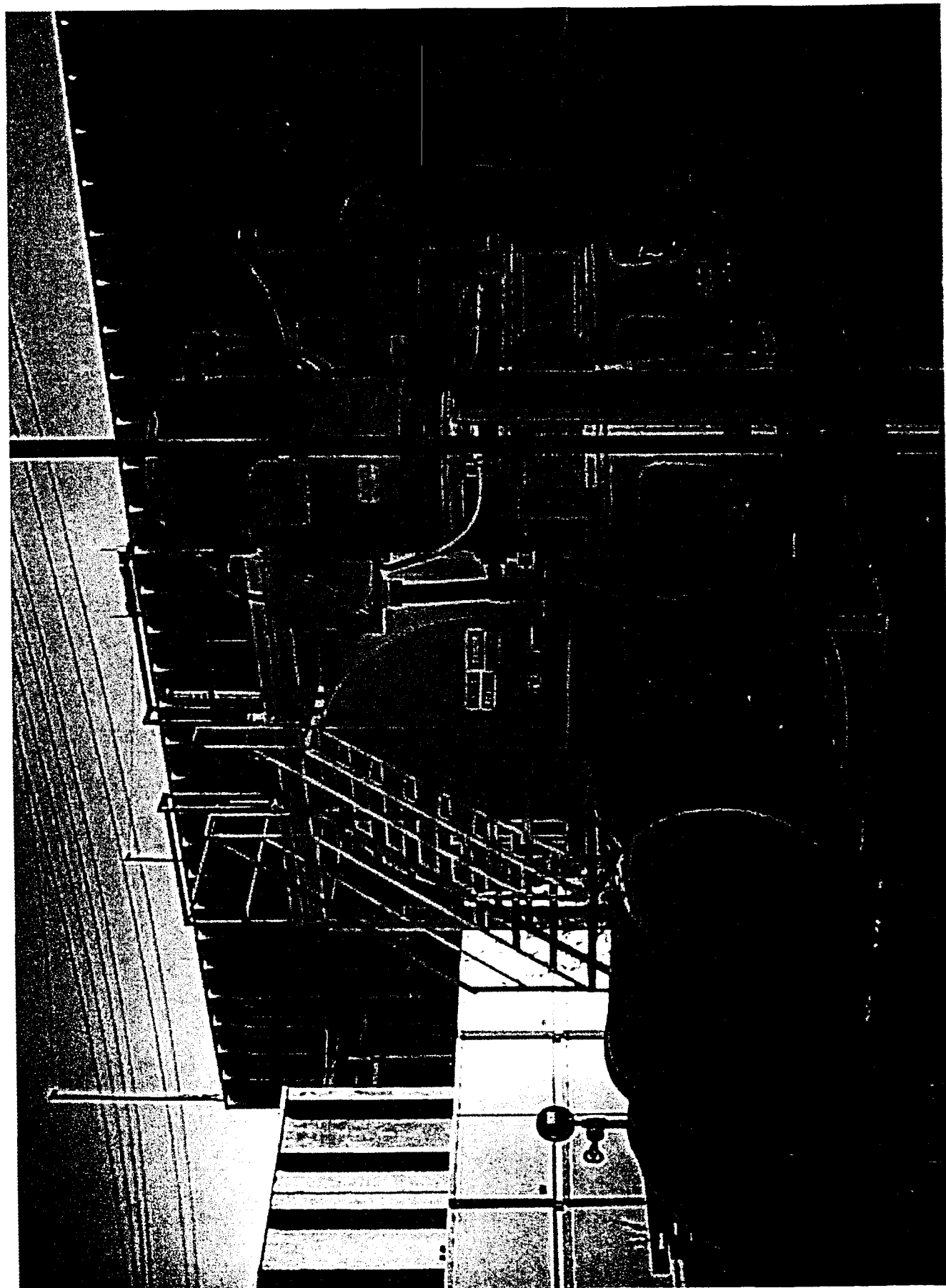




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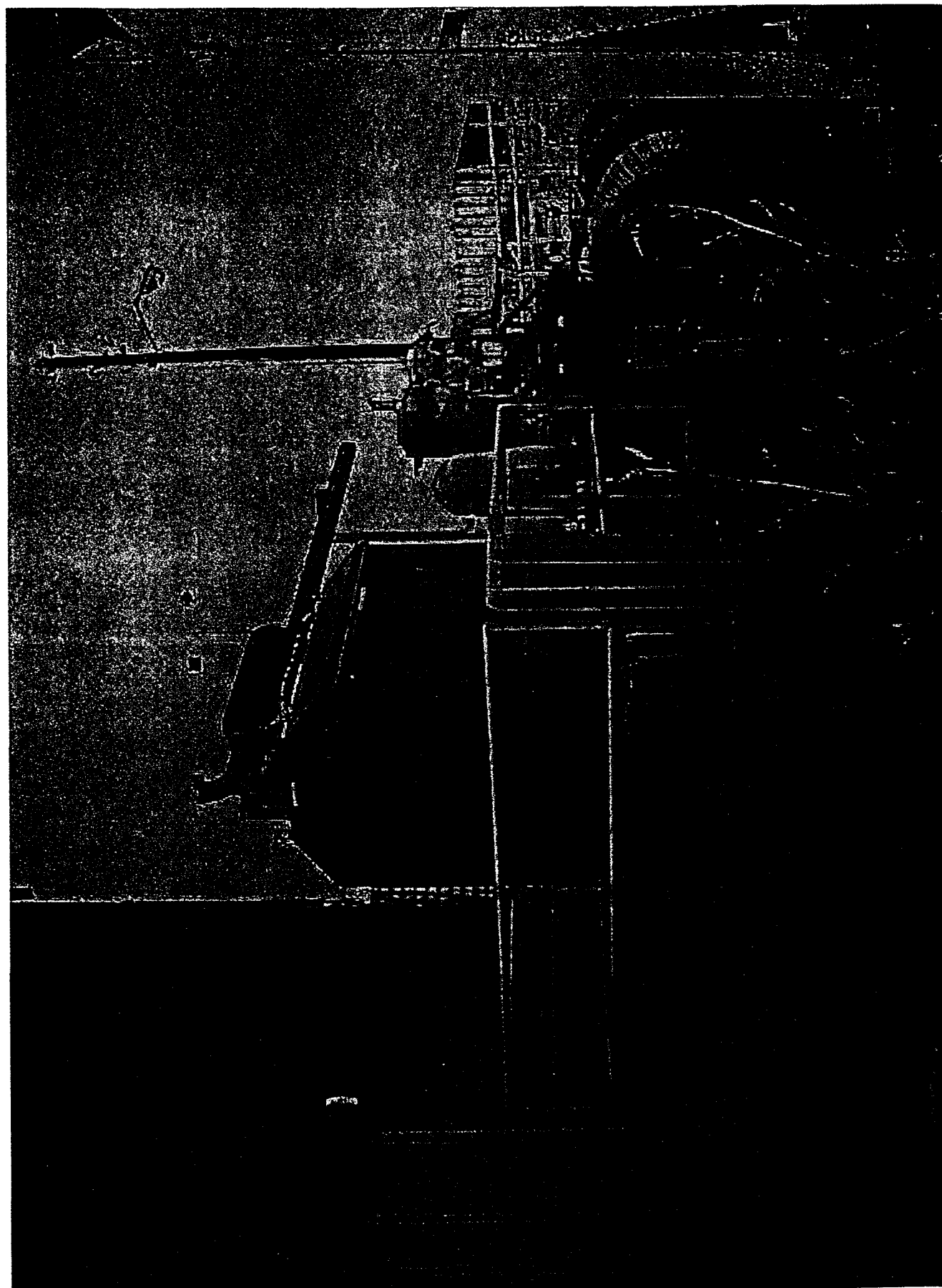
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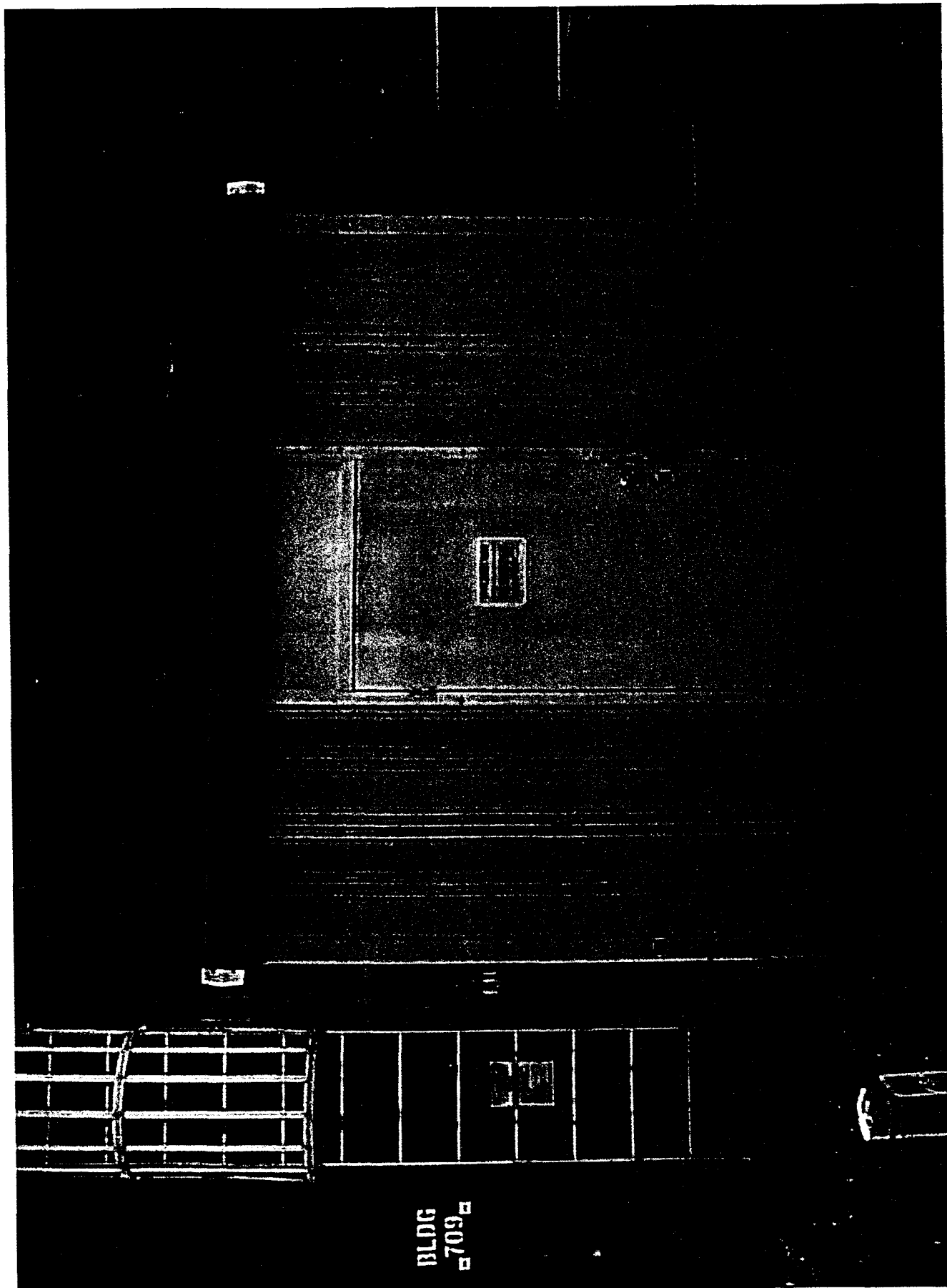
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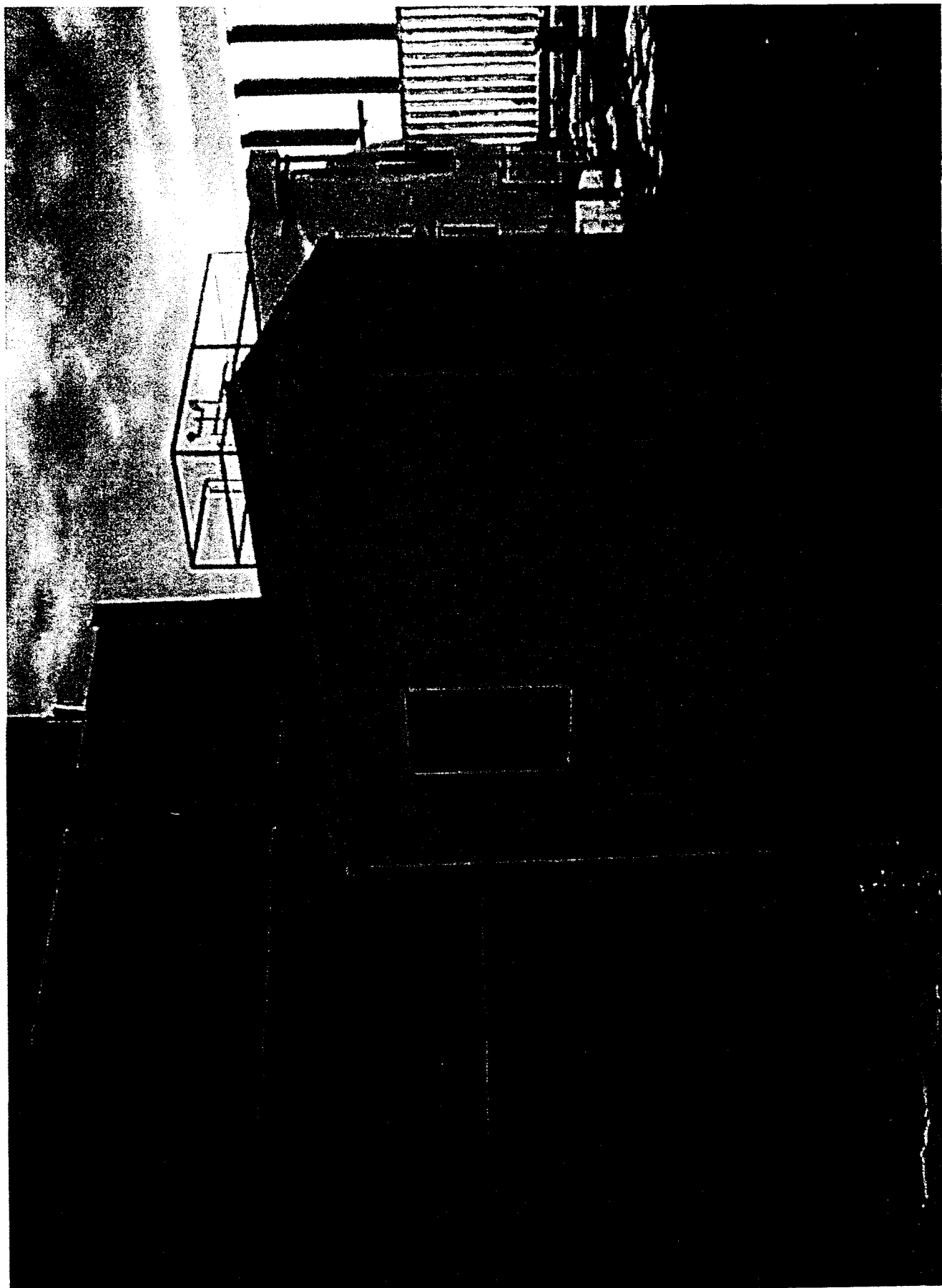
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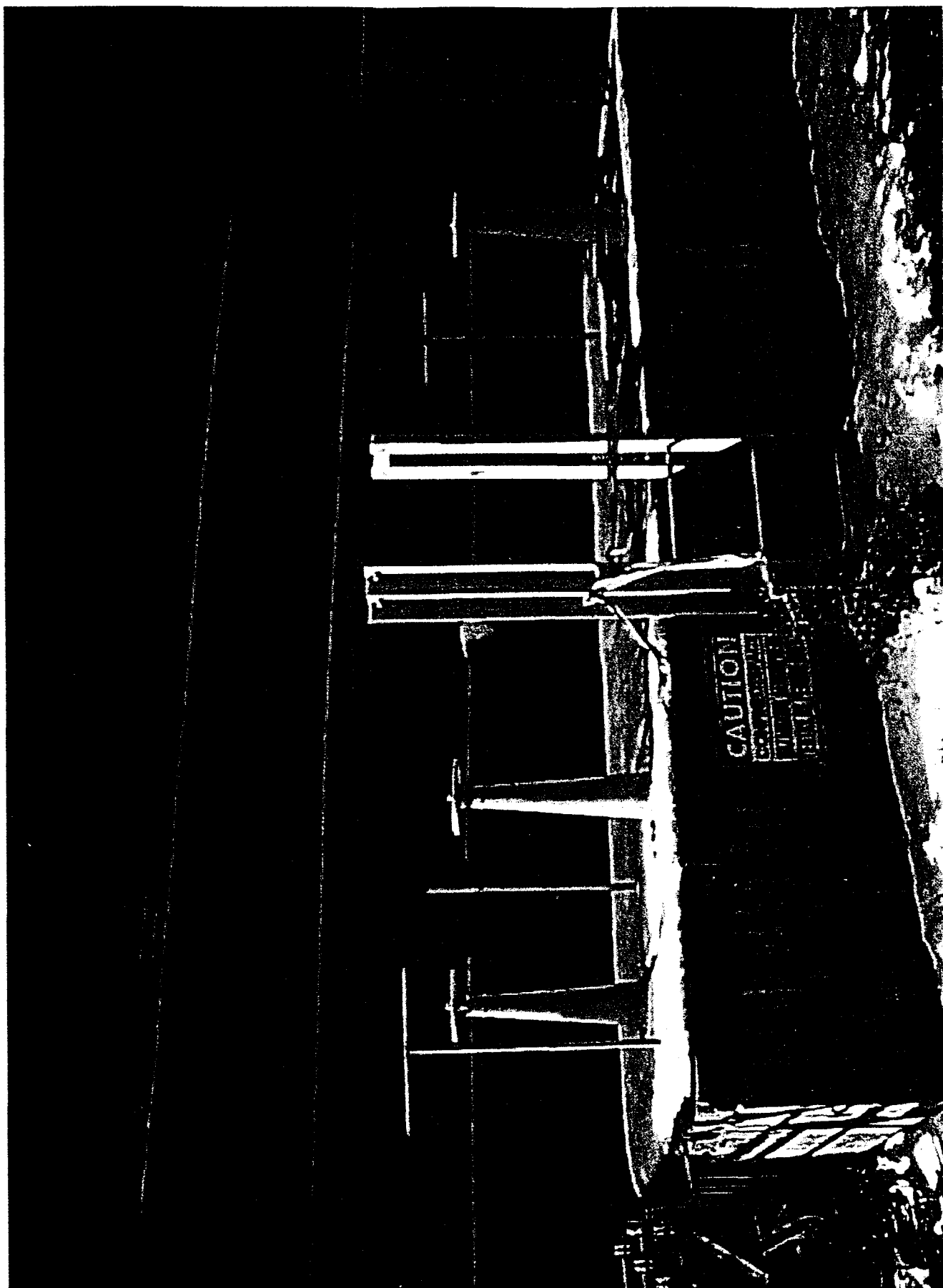
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ATTACHMENT B

Radiological And Chemical Characterization Package

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Rocky Flats Environmental Technology Site
Pre-Demolition Survey Package for Building 709

707 Closure Project

April 2001

Revision 0

Approved by:

Tom Scott
D&D Programs

Date

Steve Luker
Quality Assurance

Date

Karen Lavorato
Environmental Manager

Date

Debby Davidson
Radiological Safety Manager

Date

Mark Hickman
Project Manager

Date

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1.0 INTRODUCTION

This Pre-Demolition Survey (PDS) Package describes the necessary surveys and sampling to release B709 without restrictions. The facility includes the cooling tower, its basin, the valve vault, the overflow pit, the pump platform and pits, the generator platform, and the chemical feed and fire protection sheds. The PDS is designed in accordance with the *Decontamination and Decommissioning Characterization Protocol* (DDCP; MAN-077-DDCP) and the *Pre-Demolition Survey Plan* (PDSP), including the Data Quality Objectives (DQOs) presented in the PDSP. The DQO process was used to evaluate existing information and data and to determine additional characterization requirements. All quality assurance requirements presented in the DDCP will be followed in the conduct of the PDS.

The facility was initially characterized as part of the Group A Reconnaissance Level Characterization (RLC; refer to the Group A Reconnaissance Level Characterization Report, dated October 14, 1999). Seventy-one radiological survey measurements were taken from the cooling tower (20 from basin walls, 11 from basin floor/slab, 20 from ceiling/roof, and 20 from exterior walls <2 meters) for alpha and beta, direct and removable contamination, plus 1 meter scans. All results on the interior and exterior were below the contamination limits prescribed in DOE Order 5400.5 and the RFETS Radiological Control Manual. Six sediment samples were taken from the basin. Some were above background range for U, Pu and Am, but all were considerably below RFCA Tier II levels (less than 10% of RFCA Tier II levels). The concentrations of all toxic metals in the wood slats and in the basin sediments were below RCRA toxicity characteristic thresholds. The tower contains no asbestos containing material (ACM), but insulation containing asbestos was found on three insulated water lines. Process knowledge gives no reason to suspect organic compound, beryllium or PCB contamination. IHSSs and PACs are in the vicinity; one is related to the underground storage tank (UST) that supplied diesel to the cooling tower. RLC results support facility classification as Type 1/MARSSIM Class 3 (i.e., data are below unrestricted release criteria presented in the Reconnaissance Level Characterization Plan, which is an appendix to the DDCP).

The PDS approach to radiological characterization is presented in Section 2.0, and the approach to non-radiological characterization is presented in Section 3.0. The PDS requirements for B709 are summarized in Table 1-1.

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TABLE 1-1 SUMMARY OF CHARACTERIZATION REQUIREMENTS

Contaminant	Sample/Survey Amount & Type	Comments
Radiological contaminants (Pu, U and Am)	30 surface activity measurements, biased surface scans, and 5 subsurface soil samples	Surface activity measurements will look for total and removable, alpha and beta/gamma contamination. Two QC measurement sets will be required for each survey unit. Because B709 is close to some IHSSs/PACs, 5 subsurface soil samples will be collected and analyzed for radionuclides.
RCRA/CERCLA Constituents	5 subsurface soil samples	RLC show that concentrations of all the toxic metals were below toxicity characteristic levels. Process knowledge and operational history indicate no potential for other chemical (e.g., volatile organic compound – VOCs) contamination. However, because B709 is close to some IHSSs/PACs, 5 subsurface soil samples will be collected and analyzed for total metals, total VOCs and TPH.
Beryllium	None required.	Process knowledge and operational history indicate no beryllium use or storage.
Polychlorinated biphenyls (PCBs)	5 subsurface soil samples	Process knowledge and operational history indicate no potential for PCB contamination. However, because B709 is close to some IHSSs/PACs, 5 subsurface soil samples will be collected and analyzed for PCBs.
Asbestos	Chemical feed and fire protection sheds inspected for ACM	Samples of any suspected ACM will be collected and analyzed. The RLC included the inspection of all the other facility components. Insulation containing asbestos was found on 3 water lines.

2.0 CHARACTERIZATION INSTRUCTION FOR RADIOLOGICAL SURVEYS AND SAMPLES

B709 will be characterized as directed by the RFETS “Pre-Demolition Survey Plan for D&D Facilities” (MAN-127-PDSP, August 28, 2000, Rev. 0) and outlined in the applicable RFETS Radiological Safety Practices (RSPs). Soil samples around the cooling tower will also be taken and analyzed.

The PDS will consist of 2 survey units, separated based on use history and RLC:

- **Cooling tower and basin/slab** - 15 random locations on basin/slab and exterior walls < 2 meters will be surveyed for direct and removable, alpha and beta-gamma contamination. Biased surface scans will be performed on 5% of floor and walls < 2 meters (approx. 30 1-meter scans). Due to safety constraints, interior surveys and scans will be limited.
- **The valve vault, the pump platform and pits, the generator platform, the fire protection shed, and chemical addition shed** - 15 random locations on interior and exterior surfaces surveyed for direct and removable, alpha and beta-gamma

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contamination. Biased surface scans will be performed on 10% of the total surface area (10 1-meter scans).

2.1 Radiological Survey Methodology

The primary radiological contaminants of concern for the purposes of surveys are determined to be plutonium and americium. For the purposes of this characterization, the more restrictive transuranic release limits required in DOE Order 5400.5 shall be applied.

A Survey Package and Data Summary will be produced for each survey unit. Survey packages will contain a cover sheet, survey/sampling instruction form, total surface activity data sheet, removable contamination data sheet, instrument sheet, investigation forms, signature sheets, and other required documentation as prescribed in the PDSP (Rev. 0).

Survey maps will be developed to accurately define the boundaries of each survey unit and to document specific measurement locations. Measurement locations will be clearly identified to provide a method of referencing survey results to survey/sample locations. Specific survey points will be established on a random basis in accordance with PRO-475-RSP-16.01, "Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure".

2.1.1 Surface Scans

Surface scan coverage for the survey unit including the valve vault, the pump platform and pits, the generator platform, and the fire protection and chemical addition sheds will be a minimum of 10%, as listed in Appendix A, Table A-1 of the PDSP. Surface scan coverage for the cooling tower and basin/slab will be a minimum of 5%. This smaller coverage is justified based on the extensive scans conducted during RLC. Surface scanning for alpha activity will be biased towards areas with the highest potential for contamination, even though no contamination was detected during RLC.

If an area of elevated activity is identified during the scan of a survey unit, an investigation will be performed to confirm the presence of elevated activity. If elevated activity is confirmed, the location of interest will be marked, and surface activity measurements for total and removable activity will be performed at that location.

Note that investigation locations will be in addition to the randomly prescribed number of measurements. This additional data will not be included in the survey unit statistical test. Rather, it will be compared directly to the applicable $DCGL_{EMC}$ (for 100 cm^2) and the $DCGL_W$ (for average over m^2).

2.1.2 Surface Activity Measurements

Total and removable surface activity measurements will be collected at random measurement locations. The minimum total number of surface activity/removable

surface activity locations required for each survey unit will be 15 measurements (i.e., 15 total activity measurements and 15 removable activity measurements). This minimum number of measurements was determined using the Measurement Calculation Worksheet as found in Appendix B of the PDSP. Survey points will be randomly generated and may fall on any surface area of the survey unit.

The Radiological Control Technician (RCT) will obtain 100 cm² total alpha direct measurements (and an accompanying local area background measurement) at each labeled measurement location per 3-PRO-165-RSP 07.02, "Contamination Monitoring Requirements". The RCT shall record the results of each measurement on the applicable survey unit's "Total Surface Activity Data Sheet".

The Radiological Control Technician (RCT) will obtain 100 cm² removable alpha measurements (smears) at each labeled measurement location per 3-PRO-165-RSP 07.02, "Contamination Monitoring Requirements". The RCT will record the results of each measurement on the applicable survey unit's "Removable Contamination Data Sheet".

2.2 Soil Sampling

Five subsurface soil samples will be collected at a depth of at least three feet, and will be analyzed for radionuclides (i.e., Pu-239/240, Am-241, U-233/234, U-235, and U-238). Sample locations are shown in the attached map. Samples will be collected and analyzed in accordance with the PDSP. Approved procedures will be used as directed by Analytical Services Division (ASD) and delineated in contract arrangements with off-site laboratories.

2.3 Radiological Survey QC Requirements

Quality assurance (QA) and quality control (QC) requirements as presented in the Site PDSP (MAN-127-PDSP, Rev. 0) and RSP-16.05, "Radiological Survey/Sample Quality Control" will be implemented during the pre-demolition radiological characterization to collect information necessary to evaluate the survey results.

To establish the overall precision, or reproducibility of surveys, duplicate measurements will be performed. As listed in the Site PDSP, the minimum number of required QC total surface activity surveys are as follows:

"Greater than or equal to 5% of the direct measurement surveys shall be repeated, and a quantitative assessment shall be performed where acceptance of the comparison is constituted by either (1) both results are < DCGL or (2) there is less than 20% difference between the two duplicate measurements."

Removable activity measurements do not require duplicate QC measurement comparison.

The duplicate total surface activity measurements will be either random or, if biased, biased towards areas with higher contamination potential.

As stated, the minimum number of total surface activity measurements for a survey unit is 15. Using the aforementioned QC requirements, a minimum of two (2) total surface activity QC measurements per survey unit is anticipated. These QC measurements should be performed with a different survey instrument and by a different technician (if possible) than the person who performed the initial survey. Forms within each survey package will accommodate and easily distinguish QC measurements, and the Data Summary calculation sheets will compare the measurements as well.

3.0 CHARACTERIZATION INSTRUCTION FOR NON-RADIOLOGICAL INSPECTION AND SAMPLING

3.1 Asbestos

The chemical feed and fire protection sheds will be inspected for friable and non-friable asbestos by a CDPHE-certified asbestos inspector. Asbestos will be differentiated as friable and non-friable. Potential asbestos containing material will be identified for sampling at the discretion of the CDPHE-certified asbestos inspector. Asbestos sampling and analyses will be performed per PRO-563-ACPR, *Asbestos Characterization Procedure*. Samples of materials will be taken using a WondermakerTM, razor knife, or similar appropriate sampling tool. All bulk samples collected will be analyzed utilizing EPA 600/M4-82020, December 1982 (Interim Method for the Detection of Asbestos in Bulk Insulation Samples) by an NVLAP-accredited laboratory.

3.2 Soils

Five subsurface soil samples will be collected at a depth of at least three feet, and will be analyzed for total metals, total VOCs, PCBs and TPH. Sample locations are shown in the attached map. Samples will be collected and analyzed in accordance with the PDSP. Sampling will be conducted as described in the Bulk Solids and Liquids Characterization Procedure (PRO-488-BLCR), the Metals and PCB Characterization Procedure (PRO-487-MPCR), or other approved sampling procedures.

ATTACHMENT C

Radiological Data Summaries and Survey Maps

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RADIOLOGICAL DATA

In accordance with the Pre-Demolition Survey Package titled “Pre-Demolition Survey Package for Building 709”, total surface activity (TSA) and removable surface activity (RSA) surveys, and scan surveys were performed in each survey unit. The number/frequency of surveys/samples collected in each area was based on guidance provided in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) and PRO-475-RSP-16.01, Radiological Survey/Sampling Package Design, Preparation, Control, Implementation, and Closure. Refer to the radiological data summaries in Attachment C for results.

Survey Unit Descriptions

The 709 cooling tower and associated structures were divided into two survey units based on similar contamination potential. A brief description and survey status of each of the survey units are described below:

Survey Unit	Description	Status
707001	709 Cooling Tower and basin/slab	Performed MARSSIM survey on basin/slab. Unsafe to perform survey on upper portion of the structure. Additional survey measurements will be performed after demolition
707002	Valve vault/pump platform and pits/generator platform/fire protection shed/chemical addition shed	Surveyed – All results < than applicable DCGLs.

Summary of Survey Unit Data

707001

Fifteen (15) TSA measurements, fifteen (15) RSA measurements, and 5% scan surveys were performed on this structure. One TSA measurement location (#4) was elevated, but less than DCGLw. An investigation was performed, and eight additional measurements were obtained. The 1 m² average for the measurement location was < 100 dpm/100 cm².

During the performance of scan surveys, elevated readings were discovered on the upper surface of the cooling tower berm. Additional total surface activity measurements were obtained on the concrete surface of the northwest corner of the berm. The horizontal surface of the berm appeared to be elevated. Therefore, a media sample was obtained at this location. The media sample result was 20.4 dpm/100 cm² total transuranic alpha, and 645.2 dpm/100 cm² total uranium. Based on the fact that the total transuranic alpha result was < 100 dpm/100 cm² (the DCGLw for transuranic alpha), and the total uranium alpha result was < 5000 dpm/100 cm² (the DCGLw for uranium alpha), no DOE – added material was present and no further investigation was required

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707002

Fifteen (15) TSA measurements, fifteen (15) RSA measurements, and 10% scan surveys were performed on these structures. Only one TSA measurement location (#3) was above the DCGLw. An investigation was performed because of the elevated reading, and eight additional measurements were obtained. The 1m² average for the measurement location was < 100 dpm/100 cm².

During the performance of scan surveys, elevated readings were discovered on the entire surface of the galvanized steel diesel generator platform. An investigation was performed, and fifteen TSA measurements were obtained. The elevated readings were attributed to Po-210. As requested by CDPHE, a coupon sample was obtained from the diesel generator platform. Alpha spec analysis was performed on the sample, and the elevated reading was confirmed to be associated with Po-210 with no DOE – added material present. No further investigation was required.

000032

Radiological Data Summary
Subsurface Soil Concentrations (pCi/gr)

RIN No. - Sample Location	Pu _{239/240}	Am ₂₄₁	U _{233/234}	U ₂₃₅	U ₂₃₈
01A0160-001	0.053	0.032	1.93	0.179	1.42
01A0160-002	0.000	0.096	0.689	0.000	0.820
01A0160-003	0.029	0.000	0.828	0.031	0.557
01A0160-004	0.021	0.066	0.829	0.059	1.12
01A0160-005	0.029	0.000	1.18	0.059	1.46
RFCA Tier II SAL	252	38	307	24	103

RFCA – Rocky Flats Cleanup Agreement
SAL – Soil Action Level

000033

SURVEY UNIT 707001 DATA

000034

Survey Unit 707001 Data Summary

<u>Total Surface Activity Measurements</u>		<u>Removable Activity Measurements</u>															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">15</td> <td style="width: 50%; text-align: center;">15</td> </tr> <tr> <td style="text-align: center;">Number Required</td> <td style="text-align: center;">Number Obtained</td> </tr> </table>	15	15	Number Required	Number Obtained	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">15</td> <td style="width: 50%; text-align: center;">15</td> </tr> <tr> <td style="text-align: center;">Number Required</td> <td style="text-align: center;">Number Obtained</td> </tr> </table>	15	15	Number Required	Number Obtained								
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100	dpm/100 cm ²																
20	dpm/100 cm ²																
<div style="text-align: center;"> MIN MAX MEAN STD DEV TRANSURANIC DCGL_w </div>	<div style="text-align: center;"> MIN MAX MEAN STD DEV TRANSURANIC DCGL_w </div>																

<u>Media Sample Activity</u>									
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1	1								
Number Required	Number Obtained								
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Number Required	Number Obtained								

<u>Total Uranium Results</u>		<u>Total Transuranic Results</u>											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">645.2</td> <td style="width: 50%; text-align: center;">dpm/100 cm²</td> </tr> <tr> <td style="text-align: center;">645.2</td> <td style="text-align: center;">dpm/100 cm²</td> </tr> <tr> <td style="text-align: center;">645.2</td> <td style="text-align: center;">dpm/100 cm²</td> </tr> </table>	645.2	dpm/100 cm ²	645.2	dpm/100 cm ²	645.2	dpm/100 cm ²	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">20.4</td> <td style="width: 50%; text-align: center;">dpm/100 cm²</td> </tr> <tr> <td style="text-align: center;">20.4</td> <td style="text-align: center;">dpm/100 cm²</td> </tr> <tr> <td style="text-align: center;">20.4</td> <td style="text-align: center;">dpm/100 cm²</td> </tr> </table>	20.4	dpm/100 cm ²	20.4	dpm/100 cm ²	20.4	dpm/100 cm ²
645.2	dpm/100 cm ²												
645.2	dpm/100 cm ²												
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5000	dpm/100 cm ²												
100	dpm/100 cm ²												
<div style="text-align: center;"> MIN MAX MEAN DCGL_w </div>	<div style="text-align: center;"> MIN MAX MEAN DCGL_w </div>												

000035

Survey Unit 707001 Building 709 Total Surface Contamination Results

Total Surface Activity Survey					Quality Control Survey					
Meter Model:	NE Electra w/ DP6 Probe		Local Area Bkgd (cpm)	NE Electra w/ DP6 Probe		Local Area Bkgd (cpm)				
Instrument #:	3120	N/A	N/A	3975	N/A	1.4				
Cal. Due Date:	10/12/01	N/A		8/14/01	N/A					
Efficiency (c/d):	0.207	N/A		0.208	N/A					
Total Surface Activity Measurements			Quality Control Measurements							
Sample Location Number	Instrument #	Date	(cpm)	MDA (dpm/100 cm²)	(dpm/100 cm²)	Instrument #	Date	(cpm)	MDA (dpm/100 cm²)	(dpm/100 cm²)
1	7	06/01/01	6.0	43	11.8					
2	7	06/01/01	16.0	43	60.1					
3	7	06/01/01	8.7	43	24.9					
4 Note 1	7	06/01/01	17.8	43	68.8	Note 1				
5	7	06/01/01	18.7	43	73.2	3975	06/06/01	16.0	30	70.3
6	7	06/01/01	14.0	43	50.5					
7	7	06/01/01	6.7	43	15.2					
8 Note 2	9	06/06/01	22.9	43	93.4	Note 2				
9	7	06/01/01	18.0	43	69.8					
10	7	06/01/01	12.0	43	40.8					
11	7	06/01/01	14.0	43	50.5					
12	7	06/01/01	9.4	43	28.2					
13	7	06/01/01	8.0	43	21.5					
14	7	06/01/01	16.0	43	60.1					
15	7	06/01/01	19.3	43	76.1	3975	06/06/01	17.3	30	76.6
				MIN	11.8					
				MAX	93.4					
				MEAN	49.7					
				SD	25.0					
				Transuranic DCG _{Lw}	100					

Note 1 - An investigation was performed, and eight additional readings were obtained to verify the 1m average was less than 100 dpm/100 cm². This value is the average of the nine measurements.

Note 2 - An investigation was performed, and eight additional readings were obtained to verify the 1m average was less than 100 dpm/100 cm². This value is the average of the nine measurements. The elevated activity can be attributed to natural uranium activity as indicated by the media sample obtained on an adjacent surface near location #14.

000036

Survey Unit 707001 Building 709 Smear Results

Smear Location Number	Smear Results				
	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA
1	982	6/1/01	0.0	-0.6	7.6
2	1467	6/1/01	0.0	-0.6	4.1
3	982	6/1/01	1.0	2.4	7.6
4	1057	6/1/01	0.0	-0.6	6.5
5	1467	6/1/01	1.0	2.4	4.1
6	982	6/1/01	0.0	-0.6	7.6
7	1467	6/1/01	0.0	-0.6	4.1
8	1057	6/1/01	0.0	-0.6	6.5
9	1467	6/1/01	0.0	-0.6	4.1
10	1057	6/1/01	1.0	2.4	6.5
11	982	6/1/01	0.0	-0.6	7.6
12	982	6/1/01	0.0	-0.6	7.6
13	1057	6/1/01	0.0	-0.6	6.5
14	1057	6/1/01	2.0	5.5	6.5
15	1467	6/1/01	0.0	-0.6	4.1
			MIN	-0.6	
			MAX	5.5	
			MEAN	0.4	
			SD	1.9	
			Transuranic DCG _{LW}	20	

000037

Survey Unit 707001 Building 709 Solid Media Sample Results

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in ²)	INDIVIDUAL NUCLIDE (dpm/100cm ³)	ESTIMATED MDA (dpm/100cm ³)	URANIUM TOTAL (dpm/100cm ³) DCGL _w =5000	TRANSURANIC TOTAL (dpm/100cm ³) DCGL _w =100
Top of cooling tower basin northwest wall, Bldg 709	14	001.001	U-233/234	2.600	0.069	50.00	15.19	294.5	7.8	645.2	
			U-235	0.126	0.085			14.3	9.6		
			U-238	2.970	0.069			336.4	7.8		
			Pu-238	-0.120	0.144			-13.6	16.3		
			Pu-239/240	0.180	0.081			20.4	9.2		
			Am-241	-0.027	0.192			-3.1	21.7		
											20.4

MIN	645.2	20.4
MAX	645.2	20.4
MEAN	645.2	20.4
DCGL _w =		5000
		100

000038

SURVEY UNIT 707002 DATA

000039

Survey Unit 707002 Data Summary

Total Surface Activity Measurements

15	15
Number Required	Number Obtained

MIN dpm/100 cm²
 MAX dpm/100 cm²
 MEAN dpm/100 cm²
 STD DEV dpm/100 cm²

TRANSURANIC
 DCGL_w 100 dpm/100 cm²

Removable Activity Measurements

15	15
Number Required	Number Obtained

MIN dpm/100 cm²
 MAX dpm/100 cm²
 MEAN dpm/100 cm²
 STD DEV dpm/100 cm²

TRANSURANIC
 DCGL_w 20 dpm/100 cm²

000040

Survey Unit 707002 Building 709 Total Surface Contamination Results

Total Surface Activity Survey					Quality Control Survey				
Meter Model:	2093	NE Electra w/ DP6 Probe			NE Electra w/ DP6 Probe				Local Area Bldg (cpm)
Instrument #:	2093	2093	N/A		3975	N/A	N/A		5.7
Cal. Due Date:	10/19/01	10/19/01	N/A		8/14/01	N/A	N/A		
Efficiency (cid):	0.208	0.207	N/A		0.208	N/A	N/A		
Total Surface Activity Measurements					Quality Control Measurements				
Sample Location Number	Instrument #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)	Instrument #	Date	(cpm)	MDA (dpm/100 cm ²)
1	7	05/31/01	6.7	35	21.9				
2	7	05/31/01	12.7	35	50.7				
3	7	5/31/2001 Note 1	22.3	35	96.9	Note 1			
4	7	05/31/01	11.3	35	44.0				
5	7	05/31/01	6.7	35	21.9				
6	7	05/31/01	14.0	35	57.0				
7	7	05/31/01	14.7	35	60.3	9	06/06/01	26.0	52
8	7	05/31/01	3.3	35	5.5				
9	9	06/01/01	6.0	35	18.6				
10	7	05/31/01	4.0	35	8.9				
11	7	05/31/01	14.0	35	57.0	9	06/06/01	18.7	52
12	7	05/31/01	11.3	35	44.0				
13	7	05/31/01	5.3	35	15.1				
14	7	05/31/01	9.3	35	34.4				
15	7	05/31/01	13.3	35	53.6				
					MIN				
					MAX				
					MEAN				
					SD				
					Transuranic DCGL _w				100

Note 1 - An investigation was performed, and eight additional readings were obtained to verify the 1m average was less than 100 dpm/100 cm². This value is the average of the nine measurements.

000041

Survey Unit 707002 Building 709 Smear Results

Smear Location Number	Smear Results				
	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA
1	982	5/31/01	0.0	-1.5	8.3
2	1057	5/31/01	1.0	1.5	9.6
3	982	5/31/01	0.0	-1.5	8.3
4	1467	5/31/01	0.0	-1.5	8.3
5	1467	5/31/01	0.0	-1.5	8.3
6	1467	5/31/01	0.0	-1.5	8.3
7	1467	5/31/01	1.0	1.5	8.3
8	982	5/31/01	0.0	-1.5	8.3
9	982	5/31/01	5.0	13.6	8.3
10	1057	5/31/01	1.0	1.5	9.6
11	1467	5/31/01	0.0	-1.5	8.3
12	1057	5/31/01	1.0	1.5	9.6
13	982	5/31/01	0.0	-1.5	8.3
14	1057	5/31/01	0.0	-1.5	9.6
15	1057	5/31/01	0.0	-1.5	9.6
			MIN	-1.5	
			MAX	13.6	
			MEAN	0.3	
			SD	3.9	
			Transuranic DCG _{LW}	20	

000042

Survey Unit 707001 - Bldg 709 basin & walls < 2m										Survey Unit 707002 - Bldg 709 support structures < 2m									
N										N									
Basin slab & interior walls										Chemical addition shed									
Pump sump (inaccessible)										Fire Protection Shed									
Exterior Walls (< 2 meters only)										Valve Vault									
North wall										Diesel Generator Platform									
East Wall										DG									
South Wall										Roof									
West wall										under water									
Area 401 m ²										Area 302 m ²									
Scans 20 m ²										Scans 34 m ²									
= one square meter										= one square meter									
= 1.5"/sec scan										= 1.5"/sec scan									
= direct & smear										= direct & smear									
= area inaccessible										= area inaccessible									

ATTACHMENT D

Chemical Data Summary and Sample Map

000044

Chemical Data Summary Subsurface Soil Samples

Analytes	Sample No. – Sample Location				
	01A0160-001	01A0160-002	01A0160-003	01A0160-004	01A0160-005
Metals (mg/kg)	< RFCA Tier II SALs	< RFCA Tier II SALs	< RFCA Tier II SALs	< RFCA Tier II SALs	< RFCA Tier II SALs
Toluene (µg/kg)	94	89	89	90	91
Dibromo- fluoromethane (µg/kg)	99	98	96	97	97
Bromofluoro- benzene (µg/kg)	77	79	73	76	83
Diesel Range Organics (µg/kg)	0.91	1.2	1.4	1.1	Non-detect
Gasoline Range Organics (µg/kg)	Non-detect	Non-detect	Non-detect	Non-detect	Non-detect
PCBs (µg/kg)	Aroclor 1254 – 11.0 All other Aroclors – Non-detect	Aroclor 1260 – 11.6 All other Aroclors – Non-detect	All Aroclors – Non-detect	Aroclor 1254 – 18.9 All other Aroclors – Non-detect	All Aroclors – Non-detect

- RFCA – Rocky Flats Cleanup Agreement
- SAL – Soil Action Level
- The metals analysis included many metals, and there is a RFCA Tier II SAL for each metal. Metals data are presented in the B709 Characterization Project file.
- The RFCA Tier II SAL (subsurface soil) for toluene is 7,070 µg/kg.
- There are no RFCA Tier II SALs for dibromofluoromethane and bromofluorobenzene, however, detected concentrations were very low.
- Concentrations for diesel range organics were estimated. Concentrations were very near the detection limits. There are no RFCA Tier II SALs for diesel range organics or gasoline range organics
- The RFCA Tier II SAL (subsurface soil) for individual PCB Aroclors is 25 mg/kg (25,000 µg/kg).

000045

Figure 2

Location of the 709 Cooling Tower
Subsurface Soil Samples

EXPLANATION
● Surface Soil Sample

Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Topographic Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCE MAP FEATURES:
Map features were digitized from aerial photography and other sources. The data was checked for accuracy and completeness. The data was then loaded into the GIS database. The data was then used to create the map. The data was then checked for accuracy and completeness. The data was then loaded into the GIS database. The data was then used to create the map.

Scale = 1 : 340

1 inch represents approximately 28 feet



State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

0000040

Prepared by:

DynCorp

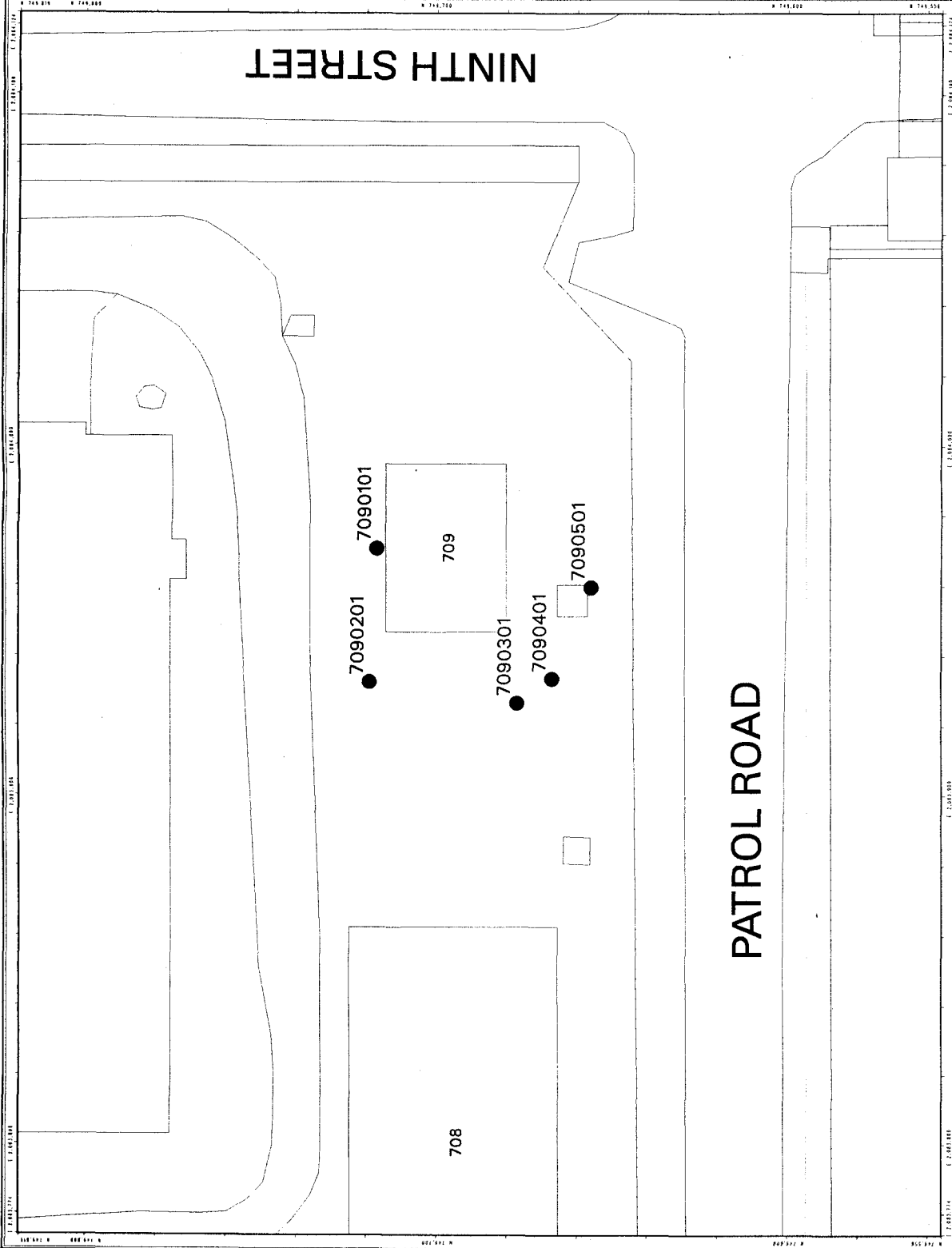
MAP ID: 01-0707

Prepared for:



0000040

September 25, 2001



09/27/01

ATTACHMENT E

Data Quality Assessment (DQA) Details

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09/27/01

DATA QUALITY ASSESSMENT (DQA) – B709 PDSR

INTRODUCTION

Data used in making management decisions for decommissioning and waste management must be of adequate quality to support decisions. Determination of adequate data quality is accomplished through the DQA. Adequate data quality for decision-making is required by the Kaiser-Hill Team Quality Assurance Program (K-H, 1997, §7.1.4 and 7.2.2), as well as by the customer (DOE, RFFO; Order 414.1A, Quality Assurance, §4.b.(2)(b)). Regulators and the public also expect decisions and data that are technically and legally defensible.

Verification and validation criteria, used for the DQA, are summarized in tabular format for each category of data, which is based on the type of analytical method. These summaries are provided in Tables E-1 (metals) E-2 (total petroleum hydrocarbon), E-3 (VOC), E-4 (PCB), and E-5 (isotopics). All quality controls were within tolerance with any exceptions noted. A completeness summary addresses all data acquired for the Project and is given in Table E-6. The DQA checklist for radiological survey data is maintained in the original radiological Survey Package (taken from RSP 16.04).

This report will be submitted to the CERCLA Administrative Record for permanent storage within 30 days of approval by the Regulators. All radiological data are organized into Survey Packages, which correlate to unique (MARSSIM) Survey Units. Chemical and isotopic data are organized by RIN, which contains the entire analytical data package.

No beta/gamma survey designs were implemented for B709 based on the conservatism of the transuranic limits used as DCGLs in the unrestricted release decision process. Stated differently, based on the well-established suite of actinides historically used at the RFETS, all of these actinides would emit alpha radiation in exceedance of the applicable transuranic DCGLs before other DCGLs would be exceeded for their respective Uranium species – Technical Basis Document 00162, Rev. 0, *Technical Justification for Types of Surveys Performed During Reconnaissance Level Characterization Surveys and Pre-Demolition Surveys in RISS Facilities*, corroborates the use of this conservative approach.

Consistent with EPA's G-4 DQO process, the radiological survey design was optimized by checking actual measurement results (acquired during pre-demolition surveys) against model output with original estimates. Use of actual sample/survey (result) variances in the MARSSIM DQO model confirms that an adequate number of surveys were acquired; this is indicated by a standard deviation value of less than 0.30 for each individual survey unit. This DQA implements QA guidelines taken from the following MARSSIM sections:

- §4.9, Quality Control
- §8.2, Data Quality Assessment
- §9.0, Quality Assurance & Quality Control

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- Appendix E, Assessment Phase of the Data Life Cycle
- Appendix N, Data Validation using Data Descriptors.

SUMMARY

In summary, the data presented in this report have been verified and validated relative to quality requirements and the project decisions as stated in the original DQOs. All data are satisfactory for the decisions made. All media surveyed and sampled yielded results less than their associated action levels, and all with acceptable uncertainties. Therefore, the Survey Units and structures in question meet the unrestricted-release criteria with the confidences stated in this section and the report in total.

000049

Table E-1 V&V of Chemical Results – Metals

V&V CRITERIA, CHEMICAL ANALYSES			DATA PACKAGE		COMMENTS
Metals (total)	METHOD: SW6010/6020	LAB --->	GEL (Charleston SC)		
		RIN ---->	01A0160		
QUALITY REQUIREMENT			measure	frequency	
ACCURACY	calibrations	initial	$r^2 > 0.99$	≥1/batch	
		continuing	80%<%R<120%	≥1/batch	
	LCS		80%<%R<120%	≥1/batch	
	MS		75%<%R<125%	≥1/batch	
	blanks	lab	mg/kg	≥1/batch	
PRECISION	serial dilutions		%D<10%	≥1/batch	
	interference check std (ICP)		80%<%R<120%	bracket batch	
	MSD		RPD<30%	≥1/batch	
	field duplicate		all results < RL	≥1/batch	
	COC		qualitative	NA	
REPRESENTATIVENESS	hold times/preservation		≤180 days	NA	
	Controlling Documents (Plans, Procedures, Maps, etc.)		qualitative	NA	
COMPARABILITY			mg/kg	NA	
COMPLETENESS	Plan vs. Actual samples		>95%	NA	
SENSITIVITY	usable results vs. unusable detection limits		>95%		
			various	all analytes	
					All reporting limits were less than one order of magnitude of the associated action level.

000050

Table E-2 V&V of Chemical Results – Total Petroleum Hydrocarbons (TPH)

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		QUALITY REQUIREMENT	COMMENTS
Gasoline Range Organics (GRO) & Diesel Range Organics (DRO)	METHOD: SW8015	LAB ---->	GEL (Charleston SC)		
		RIN ---->	01A0160		
QUALITY REQUIREMENT					COMMENTS
ACCURACY		measure	frequency		
	calibrations	$r^2 > 0.99$	≥ 1/batch	initial	original data package filed by ASD, Bldg 881
		80% < %R < 120%	≥ 1/batch	continuing	as above
	LCS	80% < %R < 120%	≥ 1/batch		Accuracy was adequate based on acceptable percent recoveries of LCS performed on a laboratory batching basis (spike @ x ug).
	MS	75% < %R < 125%	≥ 1 batch		
	blanks	ug/kg	≥ 1/batch	lab	Because sample results are extremely low and there are no RFCA action levels, blank results did not affect decisions
	surrogate	%R (variable)	≥ 1/batch		
	MSD	RPD < 30%	≥ 1/batch*		
	field duplicate	all results < RL	≥ 1/batch		None taken; however, overall repeatability within the sample set was evident based on all 5 sample results at or near detection limits.
REPRESENTATIVENESS	COC	qualitative	NA		Chain-of-Custody intact; data packages complete; containers w/ custody seals
	hold times/preservation	≤ 14 days	NA		
	Controlling Documents (Plans, Procedures, maps, etc.)	qualitative	NA		SW-846 analytical methods; original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process; data reporting format satisfactory – summary format (report) combined with complete data packages (on file w/ ASD)
COMPARABILITY		ug/kg	NA		Use of standardized engineering units in the reporting of measurement results;
COMPLETENESS	Plan vs. Actual samples usable results vs. unusable	> 95%	NA		
SENSITIVITY	detection limits	various	all analytes		No RFCA action levels exist for TPH, detections of TPH are at extremely low mg/kg levels.

000051

Table E-3 V&V of Chemical Results – Volatile Organic Compounds (VOCs)

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		QUALITY REQUIREMENT	COMMENTS
VOCs	METHOD: SW8260	LAB ---->	GEL (Charleston SC)		
		RIN ---->	01A0160		
QUALITY REQUIREMENT					COMMENTS
ACCURACY	calibrations	initial	measure	frequency	
		continuing			
			±40%D in Response Factor	≥1/batch	2 analytes failed, but not significantly enough to affect detection limits
	LCS		80%<%R<120%	≥1/batch	as above
	MS		80%<%R<120%	≥1 batch	Accuracy was adequate based on acceptable percent recoveries of LCS performed on a laboratory batching basis (spike @ x ug).
	blanks	lab	75%<%R<125%	≥1 batch	Because real sample results either did not exceed RFCA action levels or RFCA action levels do not exist, blank results did not affect decisions
PRECISION	internal standards		ug/kg	≥1/batch	
	surrogate		retention times and area factors	≥1/batch	
	MSD		%R (variable)	≥1/batch	
	field duplicate		RPD<30%	≥1/batch	None taken; however, overall repeatability within the sample set was evident based on all 5 sample results at or near detection limits.
REPRESENTATIVENESS	COC		all results < RL	NA	Chain-of-Custody intact; data packages complete; containers w/ custody seals
	hold times/preservation		qualitative	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)		≤ 14 days	NA	
COMPARABILITY			qualitative	NA	SW-846 analytical methods; original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process; data reporting format satisfactory – summary format (report) combined with complete data packages (on file w/ ASD)
COMPLETENESS			ug/kg	NA	Use of standardized engineering units in the reporting of measurement results;
SENSITIVITY	Plan vs. Actual samples		>95%	NA	
	usable results vs. unusable detection limits		>95%	all analytes	All reporting limits were less than one order of magnitude of the associated action level.

000052

Table E-4 V&V of Chemical Results – PCBs

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		COMMENTS
PCBs	METHOD: SW8280	LAB ---->	GEL (Charleston SC)	
		RIN ---->	01A0160	
QUALITY REQUIREMENT				
		measure	frequency	
ACCURACY	calibrations	initial	≥1/batch	Original data package filed by ASD, Bldg 881
		continuing	≥1/batch	as above
	LCS	80%<%R<120%	≥1/batch	Accuracy was adequate based on acceptable percent recoveries of LCS performed on a laboratory batching basis (spike @ x ug).
	MS	80%<%R<120%	≥1/batch	Some results out of tolerance as denoted by "N" lab qualifier; no impact on decisions based on same results estimated at significantly lower values than RFCA Tier II action levels
PRECISION	blanks	<MDL	≥1/batch	Because no real sample results exceeded action levels, blank results did not affect decisions
	MSD	75%<%R<125%	≥1/batch	
REPRESENTATIVENESS	field duplicate	all results < RL	≥1/batch	None taken; however, overall repeatability within the sample set was evident based on all 5 sample results at or near detection limits.
	COC	qualitative	NA	Chain-of-Custody intact; data packages complete; containers w/ custody seals
	hold times/preservation	≤30 days extract ≤45 days analysis	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)	qualitative	NA	SW-846 analytical methods; original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process; data reporting format satisfactory – summary format (report) combined with complete data packages (on file w/ ASD)
COMPARABILITY		ug/kg	NA	Use of standardized engineering units in the reporting of measurement results;
COMPLETENESS	Plan vs. Actual samples usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	detection limits	various	all analytes	All reporting limits were less than one order of magnitude of the associated action level.

000053

Table E-5 V & V of Chemical Results – Isotopics

V&V CRITERIA, Radiochemistry		DATA PACKAGE		COMMENTS
Isotopics	METHOD: Alpha Spec	LAB ---->	Sanford Cohen	
		RIN ---->	01A0160 01C0159	
		LAB	RFETS; on site	
		RIN	NA	
QUALITY REQUIREMENT				COMMENTS
		measure	frequency	
ACCURACY	calibrations	$r^2 > 0.99$	≥1/batch	original data package filed by ASD, Bldg 881
		continuing	≥1/batch	as above
	LCS	80% < %R < 120%	≥1/batch	Accuracy was adequate based on acceptable percent recoveries of LCS performed on a laboratory batching basis (spike @ x ug).
	background /prep blank	80% < %R < 120%	≥1/batch	Because no real sample results exceeded action levels, blank results did not affect decisions; no background subtractions were performed
PRECISION	interference check std (ICP)	pCi/g		
	LCSD	80% < %R < 120% (RPD < 20%)	≥1/batch	Intralaboratory precision was adequate based on acceptable percent recoveries of LCSD performed on a laboratory batching basis (%R ± 20% @ 10 ug).
	field duplicate	all results < RL	≥1/batch	None taken; however, overall repeatability within the sample set was evident based on all 7 sample results at or near detection limits.
REPRESENTATIVENESS	COC	qualitative	NA	Chain-of-Custody intact; data packages complete; containers w/ custody seals
	hold times/preservation	≤180 days	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)	qualitative	NA	Documented isotopic methods; original Characterization Package (planning document) for field/sampling procedures; thorough documentation of the planning, sampling/analysis process; data reporting format satisfactory – summary format (report) combined with complete data packages (on file w/ ASD)
COMPARABILITY		pCi/g	NA	Use of standardized engineering units in the reporting of measurement results;
COMPLETENESS	Plan vs. Actual samples usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	detection limits	various	all isotopes	All reporting limits were less than one order of magnitude of the associated action level.

000054

Table E-6. Sampling & Survey Completeness Summary – Building 709 (Cooling Towers) PDS

ANALYTE	# Samples Required (incl. Media; Real & QC Samples) ^B	# Taken (Real & QC Samples) ^B	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Metals (Total) ^A	(5 reals, biased) no QC	same	>95% confidence, no contamination present	RIN 01A0160
GRO	(5 reals, biased) no QC	same	>95% confidence, no contamination present	RIN 01A0160
DRO	(5 reals, biased) no QC	same	>95% confidence, no contamination present	RIN 01A0160
Pesticides	(5 reals, biased) no QC	same	>95% confidence, no contamination present	RIN 01A0160
Isotopics • soils	(5 reals [soil], biased) no QC	same	>95% confidence, no contamination present	RIN 01A0160 (5 samples)
• Bldg 709 (Survey Unit 707001)	1	same		RIN 01C0159 (1 sample) Elevated activity confirmed to be due to Uranium isotopes; converted results (to surface activity in dpm/100cm ²) were well below (Uranium) unrestricted release limits
• Bldg 709	1	same		(1 sample) Elevated activity confirmed to be due to Po-210 (not DOE- added material)
Radiological Surveys • Survey Unit: 707001	15 TSA & 15 Smears (random) 2 QC TSA 10% Scan	same	>95% confidence, no contamination present	Based on isotopic comments above, no results due to DOE- added material exceeded the DCGL _w action levels (20 dpm/100cm ² removable, 100 dpm/100cm ² [average per 1m ²])
• Survey Unit: 707002	15 TSA & 15 Smears (random) 2 QC TSA 10% Scan	same		

^A # of samples required is estimate only, based on miscellaneous material types; final # of samples at discretion of IH.